The Trackless Trolley

How It Works—Its Advantages Compared with Street Railway and Bus

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THE trackless trolley is a vehicle operating on the road surface and driven by electric motors which are supplied with electrical energy from two overhead trolley wires. This is in contradistinction to the ordinary trolley car, which is supplied with electric current from overhead wire, with the return thereof to the power-house via the track and the earth; hence the term "trackless trolley" is employed to describe this newer type of vehicle.

The trackless trolley *per se* is not essentially new; it was employed as an experimental device in Colorado as early as 1897 and has been used to a small degree in England and Germany within recent years. The most extensive use of the trackless trolley, however, is on Staten Island, borough of Richmond, city of New York, under the direction of the Department of Plant and Structures.

Staten Island is very poorly provided with transportation facilities, the interior having practically no means other than horse-drawn vehicles or automobiles. In the spring of 1921 the attention of the Commissioner of Plant and Structures was called to the fact that Linoleumville on the west shore of the Island was nearly three miles from the nearest trolley terminal and that Seaview Hospital, operated by the city of New York, was about 1.75 miles from the nearest trolley terminal. The bus drivers who covered this territory charged excessive fares, and the city emergency bus service was not allowed by the courts.

After a careful study of this problem, it was decided that a trackless trolley extension of the Midlands trolley line, operated by the city of New York, would afford the best solution. Accordingly the Meiers Corners-Linoleumville and the Meiers Corners-Seaview Hospital lines were constructed. They were opened to the public in October, 1921. Meiers Corners is the point at which the two lines connect through the agency of a loop. An incoming and an outgoing line were constructed on Richmond Turnpike, connecting the first-mentioned localities, and a single line was constructed between the loop and Seaview Hospital.

The overhead construction of a trackless trolley line is very similar to that of the ordinary trolley system, except that each line is composed of two wires placed from 14 to 18 inches between centers. A double trolley pole or two trolley poles are mounted on the roof of the car, and conductors are led from the two contact members at the top of the trolley pole or poles to the ordinary car controller and thence to the motors. When operating on a double line, such as that to Linoleumville, cars are operated as any ordinary trolley car, excepting that, since they are not fixed in position as regards travel, they can swing around obstructing traffic or pull up to the curb to allow passengers to enter or leave the car.

When cars traveling in opposite directions pass each other on a single line, one car pulls out of the way, its trolley pole is lowered to allow the other car to pass, and is then replaced on the line when the car has a clear way. No sidings are necessary. This procedure is followed on the Meiers Corners-Seaview Hospital Line.

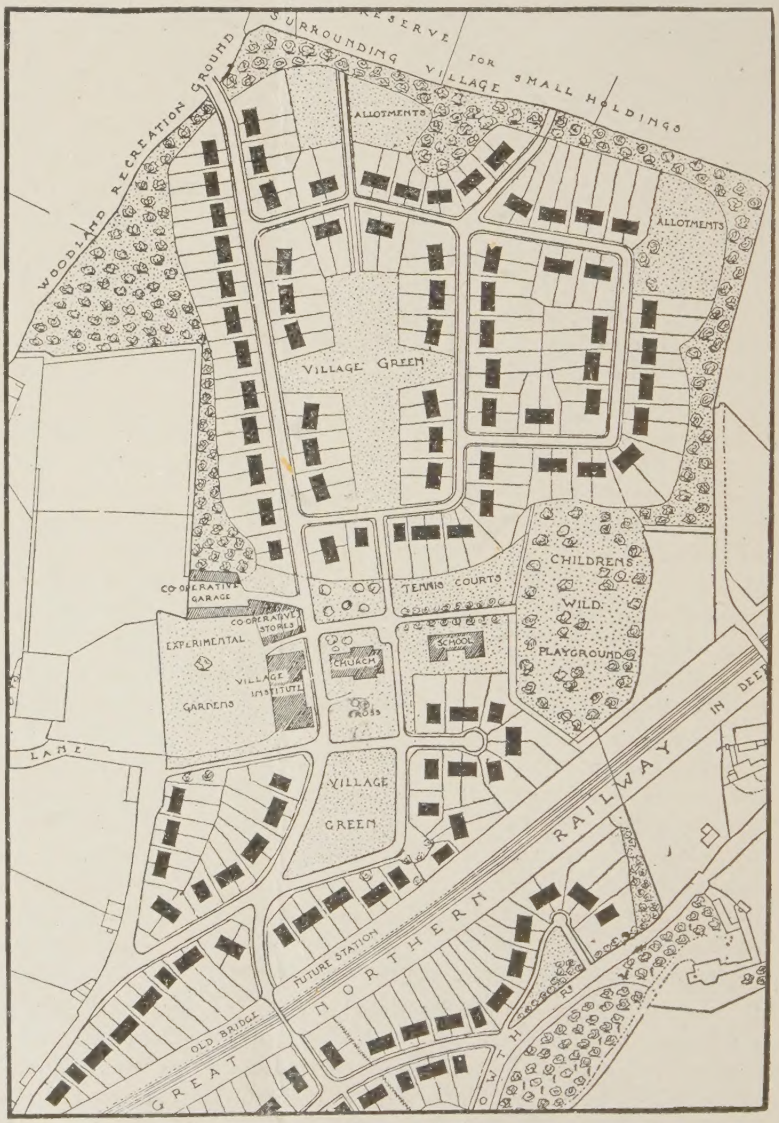
The trackless trolley car as used on these original city lines is shown in Fig. 1. This is known as the Atlas trackless trolley and is arranged to seat thirty-two passengers and carry a maximum of seventy. This photograph also shows the construction of the loop at Meiers Corners and the method of supporting the two trolley wires.

The wooden pole which is mounted on the roof has two sliding contacts which press against the trolley wires. The conductors that connect these contacts with the controller and the motors are carried down the pole along the roof of the car through a pipe to the controller, and from thence to the motors. The motors are series

more important item in the cost of the developed house plot than it is to-day. It was usual to assume a price of £300 per acre for land, and at this rate the cost of the land represented 50 per cent of the total cost in the case of a density of 12 to the acre, and 33 per cent in the case of a density of 20 to the acre. But as the average cost of the land has been in the neighborhood of £180 per acre, or only 60 per cent of the pre-war assumption, while the cost of roads and sewers has at least doubled, the proportion borne by the cost of the land to the total cost of the plot is now reduced to 23 per cent and 15 per cent respectively. Hence any system which economizes in road making has a great advantage, and a reasonable generosity in the use of land is compensated by an equivalent saving in the cost of road and sewerage works.

The other factor which influences the result is the question of building frontage. It has been usual to assume much wider frontages in the case of the low density than in the high. This does not afford a fair comparison, because within reasonable limits, both of frontage and density, the two matters are independent, and there is no reason why houses having the same frontage should not be used in the one case as in the other. However, without laboring the point further, it will be clear that if any value is attached to the greater area of land which is available both for increasing the size of the individual plots and for use as tennis grounds and other communal purposes, development at 12 houses to the acre is much more economical than at a higher density, because the benefit of the extra land is obtained at almost exactly the same cost. It will also be clear that if the reduced density is adopted—as it has been throughout the Government Housing Scheme—a type of development is required which is economical in development charges and makes the utmost legitimate use of light roads and culs-de-sac.

ACKNOWLEDGMENT.—Reprinted by permission of the Oxford University Press, American Branch, New York, from portions of chapters VI and VIII of the author's new book on "Site Planning in Practice." A section on Subdivision of Land into Building Blocks will follow in an early issue. F. Longstreth Thompson, B.Sc. (Eng., Lond.), the author of this valuable book, is Chadwick Gold Medallist in Municipal Engineering (Univ. Coll., Lon.); Assoc. M. Inst. C. E.; Member Town Planning Institute. There is a Foreword by Raymond Unwin, F.R.I.B.A., Chief Architect, Housing Department, Ministry of Health.



LAYOUT OF KILLESTRE HOUSING SCHEME NEAR DUBLIN, IRELAND, SHOWING RESERVATION OF WOODLAND BELT AROUND VILLAGE

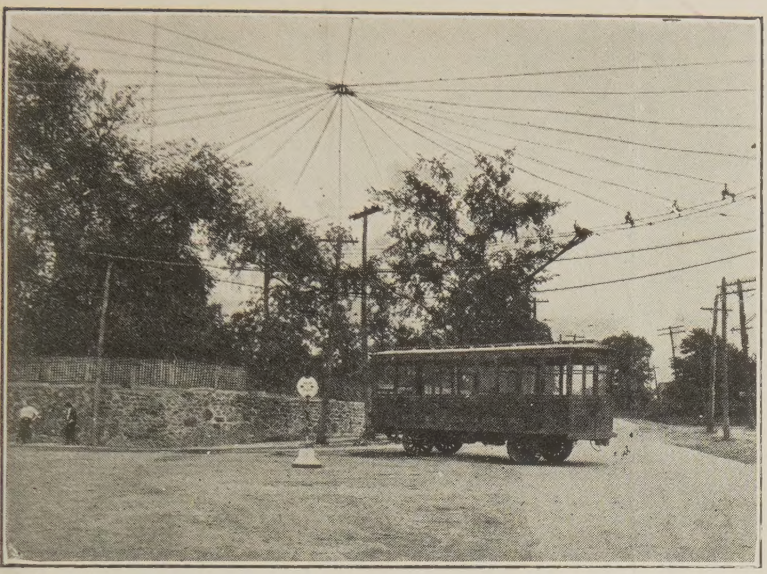


FIG. 1. TRACKLESS TROLLEY CAR USED ON ORIGINAL CITY LINES ON STATEN ISLAND, NEW YORK

wound and of 25 h.p. each, connected together mechanically by means of a propeller shaft which extends to a worm gear to drive the rear wheels. The wheels of the car are 36 inches in diameter and of the cushioned rim, cushioned tire type. The car control is like that of an ordinary trolley car. The efficient running speeds are 17 and 25 miles per hour respectively, with series and parallel electrical connection of the motors.

These initial lines passed through the severe winter of 1921-22 without an interruption of traffic, even though all other means of transportation on the island were frequently interrupted on account of snow or sleet. In fact, service was so satisfactory that when the residents of Tottenville, at the southwesterly tip of Staten Island, expressed a desire for a cheap method of travel to the city ferries at St. George, by means of which connection is made with Manhattan, it was decided to extend the St. George-Richmond division of the Midlands lines (city-operated) to Tottenville by means of a trackless trolley. The distance from Richmond to Tottenville is approximately ten miles.

Construction of an inbound and an outbound line on Arthur Kills Road, the connecting highway, was started in the early summer of 1922, and the line was opened November 4 of that year. The line construction is the same type as that employed in the earlier trackless trolley systems on the island. Power is obtained from an alternating-current power-plant located at Seaview Hospital and converted to 600 volts direct current in an automatic substation near Fresh Kills Bridge and Arthur Kills Road.

The first trackless trolleys purchased by the city had unnecessarily high road clearances and too narrow wheel treads, and were somewhat uncomfortable on account of a side swinging motion. The Engineers of the Department of Plant and Structures studied the problem and evolved a trackless trolley bus which has a much smaller road clearance, so that only one step is needed for car entrance. It has a much wider wheel tread, eliminating side motion, and a long wheel-base, giving greater comfort in riding and an improved appearance. The vehicle power-plant and general

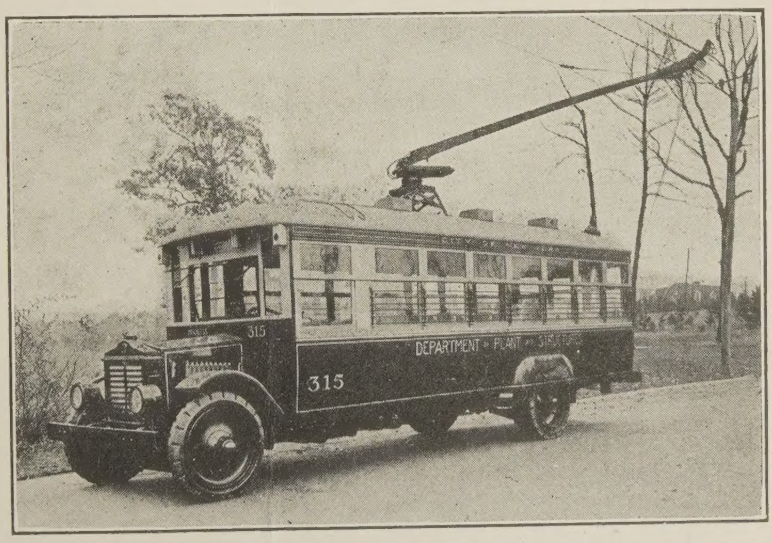


FIG. 2. NEW TYPE OF TRACKLESS TROLLEY CAR IN USE ON STATEN ISLAND

means for operation were not altered, as these proved very satisfactory in the original cars. The new type of car is shown in Fig. 2. These vehicles were built by the Brockway Motor Corporation and have given satisfaction.

A question commonly asked is, "What are the advantages of the trackless trolley over the gasoline bus?" The answer is definite: it costs 25.6 cents per mile to operate the trackless trolley over the roads on Staten Island, and it costs about 33 cents per bus-mile to operate a gasoline bus of the same capacity over the same roads. This cost includes every item, such as interest on first cost of the entire investment, depreciation and maintenance, power for operation, labor for operation, administration, etc. Another answer to the question is the psychological effect. The general public has learned that while a bus line may be operating to feed some real estate development, there is no assurance that this bus line will continue after the property of the development scheme has been sold; in fact, the public has learned the contrary. The trackless trolley, employing a relatively expensive overhead construction, conveys the assurance that this transportation is of a permanent nature. Therefo people are more prepared to buy proper along highways on which trackless trolle operate than along those upon which t uncertain bus routes obtain, and this i creases the value of the property and i tax return.

Another question which is quite fr quently asked is, "What are the advantag over the ordinary trolley systems?" Th answer to this is: the trackless trolle requires no expensive track constructio which at the present time for the ordinar trolley may vary from $40,000 to $200,00 per mile, depending upon the territor through which the trolley system is t operate and the type of track constructio required. The absence of this track con struction naturally reduces the first cos of installation very markedly and, there fore, the fixed charges. The second advan tage is the flexibility of the trackless trol ley car in that it can pass around obstruct ing traffic or pull up to the curb to allo passengers to enter or leave, thus eliminat ing the dangerous walk from the curb t the middle of the street, or the converse which obtains under present high-spee automobile travel.

Home Ownership versus Paternalism

MANY a great corporation with a strike on its hands has cried aloud the ingratitude of its employees.

They have a "model village." Each modern cottage has all conveniences, plus gardens and lawns. Rent is nominal. For social life there are churches, schools, kindergartens, day nurseries, community centers, welfare workers, moving pictures. There is opportunity for self-improvement in general culture or technical efficiency. Happiness is so easy that discontent were a sin!

Yet frequently it is precisely this managerial provision that affords the irritant. The house is the company's. The pastor is paid by the mill. The children learn in company schools. Amusements are tinged with industrial censorship.

All these things, in theory a sympathetic bond between employee and industry, too often have the feel of shackles. Real democracy strikes root deeper than wages and working conditions. Industry and politics may play the paternal to the point of substituting for Providence, and yet fail to convince the American individualist. The feudal baron held his serfs to the land by force; the qualities of ease, luxury and convenience are only disguises of a like compulsion.

In North Carolina are two industrial communities illustrating the contrast between a well-meaning error and a promise of a tru democracy of labor.

In the one case the worker lives in an apart ment house environment of domestic, educa tional, social and spiritual super-service; bu whenever he raises his eyes he sees on a com manding hill the huge mansion of the executiv head of the great hive in which he has his cel —a sign as definitely possessive as any medieva castle frowning down upon the manor.

In the other case also there is a great mill a village, and community accessories. But here the workers have home ownership as a goal under a plan by which the purchase price is saved out of earnings. In this case also there is a great executive, but he has no mansion so placed that its white walls emphasize to the village dwellers the superior estate of one whose wealth has summoned the duty of their hands.

In the one case a strike might have as a palliative of its hardships the stimulating assertion of independence; in the other it would mean the tremendous sacrifice of true homes.

Subject to reasonable ambition, every man should be tied to his job; but whether the harness galls depends upon the destination of the load.

—From *Natural Resources*, the bi-weekly Publication of the North Carolina Geological and Economic Survey.